

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Inventor application: Huo, David

Serial No.: 09/893,363

Filed: 06/27/2001

Group Art Unit: 2667

Examiner: Murphy, Rhonda, L.

For: TELECOMMUNICATIONS SYSTEM HAVING LAYERED
PROTOCOL WITH DELIMITER OF PAYLOAD

DECLARATION UNDER 37 CFR 1.131

I, David Huo, declare the following.

I am the inventor on this application. I thought of my invention prior to March 2001. At least as early as February 2001 I had thought of my invention and was working toward having my invention accepted by a 3GPP standards organization.

As part of my efforts in this regard, I attended several of the regular meetings of the group that was working on a standard called "3rd Generation Partnership Project; Technical Specification Group GSM EDGE Radio Access Network; General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol." One of those meetings occurred in early April 2001. Exhibit A attached to the end of this declaration is a document showing the date of the meeting as April 2 through April 6, 2001. This is shown in the fourth row from the bottom of the chart on page 2 of Exhibit A. Exhibit B

is a list of attendees at that meeting. Page 3 of Exhibit B shows that I attended that meeting.

Exhibit C is an excerpt from a technical report that resulted from the April 2001 meeting of the standards group of which I was a part. The third through sixth pages in Exhibit C are based upon information that I provided to the standards group as part of my efforts to have my invention accepted as part of the standard.

I recall having thought of my invention at least two months prior to the April 2001 meeting. In my experience, a proposal such as my invention would not have been placed into a technical report like what is shown in Exhibit C without having been discussed during at least one prior meeting of the standards group. I recall that group met regularly every two months. I thought of my invention at least as early as two months prior to the April 2001 meeting.

Exhibit D contains pages that are similar to what is shown in Exhibit C. I prepared the document shown in Exhibit D sometime after the April meeting of the standards group. I provided the pages shown in Exhibit D to patent counsel for purposes of having a patent application prepared for my invention. I also provided an invention submission form, a copy of which is shown in Exhibit E.

The patent application for my invention was filed on June 27, 2001.

I declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true. I acknowledge that any willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon.



David Huo

Dated: August 4, 2005

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EXHIBIT A

3GPP meetings for group GP

[Go to 3GPP meetings page](#)[Click here to go to the Liaisons page.](#)

Meeting click for details and to reserve a tdoc number	Town click for meeting invitation directory	Start click for agenda	End click for report	First & Last tdoc click for tdoc directory	WIDs click for WID list	specs available target click for list of specs from this meeting	Register	Participants	Files
GP-32	Sophia Antipolis	2006-11- 13	2006-11- 17	-	-	-	Register	Participants	-
GP-31	TBD	2006-09- 04	2006-09- 08	-	-	-	Register	Participants	-
GP-30	TBD	2006-06- 26	2006-06- 30	-	-	-	Register	Participants	-
GP-29	TBD	2006-04- 24	2006-04- 28	-	-	-	Register	Participants	-
GP-28	TBD	2006-01- 16	2006-01- 20	-	-	-	Register	Participants	-
GP-27	US	2005-11- 07	2005-11- 11	-	-	-	Register	Participants	-
GP-26	Schaumburg	2005-08- 29	2005-09- 02	-	-	-	Register	Participants	Files
GP-25	Montreal	2005-06- 20	2005-06- 24	GP-051109 - GP- 051109	WIDs	2005-07-15	-	Participants	Files
GP-24	Dublin	2005-04- 04	2005-04- 08	GP-050610 - GP- 051179	WIDs	2005-04-29	-	Participants	Files
GP-23	Tampa	2005-01- 24	2005-01- 28	GP-050001 - GP- 050609	WIDs	2005-02-18	-	Participants	Files
GP-22	Cape Town	2004-11- 08	2004-11- 12	GP-042293 - GP- 042915	WIDs	2004-12-03	-	Participants	Files
GP-21	Montreal	2004-08- 23	2004-08- 27	GP-041743 - GP- 042292	WIDs	2004-10-01	-	Participants	Files
GP-20	Bilbao	2004-06- 21	2004-06- 25	GP-041226 - GP- 041742	WIDs	2004-07-16	-	Participants	Files
GP-19	Cancun	2004-04- 19	2004-04- 23	GP-040568 - GP- 041225	WIDs	2004-05-24	-	Participants	Files
GP-18	Reykjavik	2004-02- 02	2004-02- 06	GP-040001 - GP- 040567	WIDs	2004-02-27	-	Participants	Files
GP-17	Budapest	2003-11- 17	2003-11- 21	GP-032295 - GP- 032295	WIDs	2004-01-12	-	Participants	Files
GP-16	New York	2003-08- 25	2003-08- 29	GP-031732 - GP- 032294	WIDs	2003-09-19	-	Participants	Files
GP-15	Fort Lauderdale	2003-06- 23	2003-06- 27	GP-031070 - GP- 031731	WIDs	2003-07-18	-	Participants	Files
GP-14	Munich	2003-04- 07	2003-04- 11	GP-030455 - GP- 031069	WIDs	2003-05-02	-	Participants	Files
GP-13	San Antonio	2003-02- 03	2003-02- 07	GP-030001 - GP- 030454	WIDs	2003-02-28	-	Participants	Files
Meeting						specs			

click for details and to reserve a tdoc number	Town click for meeting invitation directory	Start click for agenda	End click for report	First & Last tdoc click for tdoc directory	WIDs click for WID list	available target click for list of specs from this meeting	Register	Participants	Files
GP-12	Sophia Antipolis	2002-11-18	2002-11-22	GP-022830 - GP-023438	WIDs	2003-01-10	-	Participants	Files
GP-11	Los Angeles	2002-08-26	2002-08-30	GP-022120 - GP-022829	WIDs	2002-10-04	-	Participants	Files
GP-10	Helsinki	2002-06-24	2002-06-28	GP-021296 - GP-022119	WIDs	2002-07-19	-	Participants	Files
GP-09	Seattle	2002-04-15	2002-04-19	GP-020518 - GP-021295	WIDs	2002-05-10	-	Participants	Files
GP-08	Rome	2002-02-04	2002-02-08	GP-020001 - GP-020517	WIDs	2002-03-01	-	Participants	Files
GP-07	Cancun	2001-11-26	2001-11-30	GP-011975 - GP-012850	WIDs	2002-01-18	-	Participants	Files
GP-06	Naantali	2001-08-27	2001-08-31	GP-011453 - GP-011974	WIDs	2001-09-21	-	Participants	Files
GP-05	Chicago	2001-05-28	2001-06-01	GP-010982 - GP-011452	WIDs	2001-06-18	-	Participants	Files
GP-04	Biarritz	2001-04-02	2001-04-06	GP-010459 - GP-010981	WIDs	2001-04-30	-	Participants	Files
GP-03	London	2001-01-09	2001-01-10	GP-010001 - GP-010458	WIDs	-	-	Participants	Files
GP-02	ORLANDO	2000-12-12	2000-12-14	GP-000482 - GP-000930	WIDs	-	-	Participants	Files
GP-01	Seattle	2000-08-28	2000-09-01	GP-000001 - GP-000481	WIDs	-	-	Participants	Files

EXHIBIT B

2005-08-02

3GPP Meeting Registration

Version 1.2

Meeting: **3GPPGERAN-#4**Identifier: **20723**

LIST OF REGISTERED ATTENDEES

[View Listing](#)
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130 Registered Participants...

Any comments or problems with this application? Please let us know...

EXHIBIT C

3GPP TS 04.60 V8.9.0 (2001-04)

Technical Report

**3rd Generation Partnership Project;
Technical Specification Group GSM EDGE Radio Access Network;
General Packet Radio Service (GPRS);
Mobile Station (MS) - Base Station System (BSS) interface;
Radio Link Control/ Medium Access Control (RLC/MAC) protocol
(Release 1999)**



The present document has been developed within the 3rd Generation Partnership Project (3GPP™) and may be further elaborated for the purposes of 3GPP.

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Keywords

GSM, radio, GPRS, packet mode, mobile,
base station

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Annex B (informative): RLC data block encoding

B.1 Example 1

Figure B.1 provides an example of the use of the Length indicator in conjunction with the M and E bits. In the example, LLC PDU 1 continues from a previous RLC data block and ends in the RLC data block shown. LLC PDU 2 follows LLC PDU 1 and is completely contained within the RLC data block. LLC PDU 3 follows LLC PDU 2, beginning in the RLC data block shown, and continues into the next RLC data block.

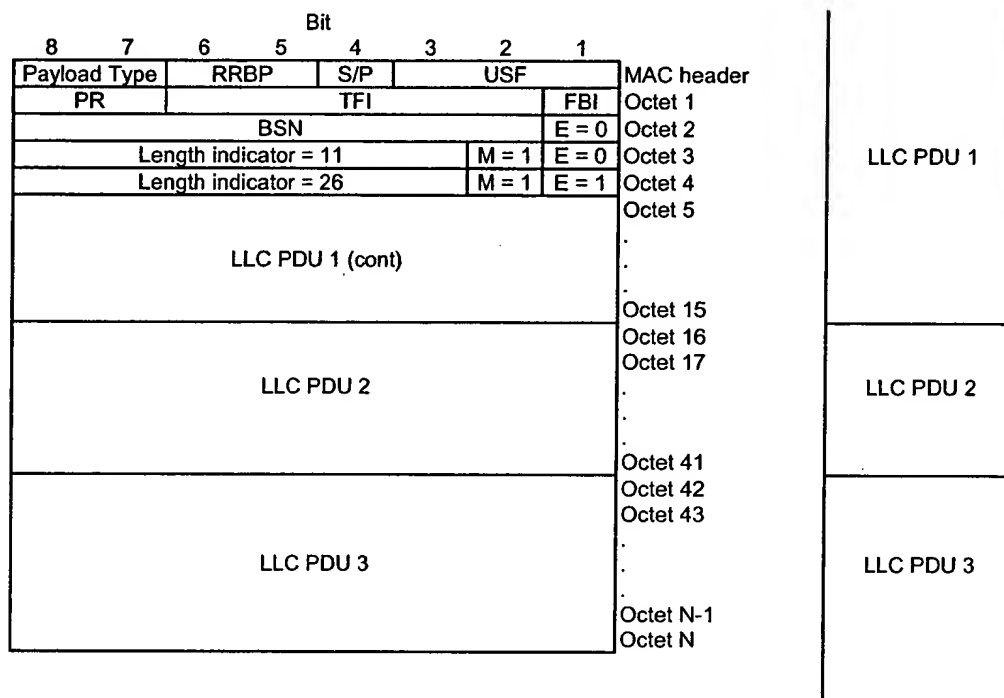


Figure B.1: Length indicator (LI) example

B.2 Example 2

Figure B.2 provides an example of the use of the Length indicator when the end of an LLC PDU would fit within an RLC data block but the addition of the length indicator octet (to indicate the LLC PDU boundary) causes the LLC PDU to extend into another RLC data block. In the example, LLC PDU 1 continues from a previous RLC data block and has 20 remaining octets. The first 19 octets are placed into RLC data block N, the Length Indicator is set to 0 (to indicate that the LLC PDU does not end within the current RLC data block), and the 20th octet is placed in RLC data block N+1.

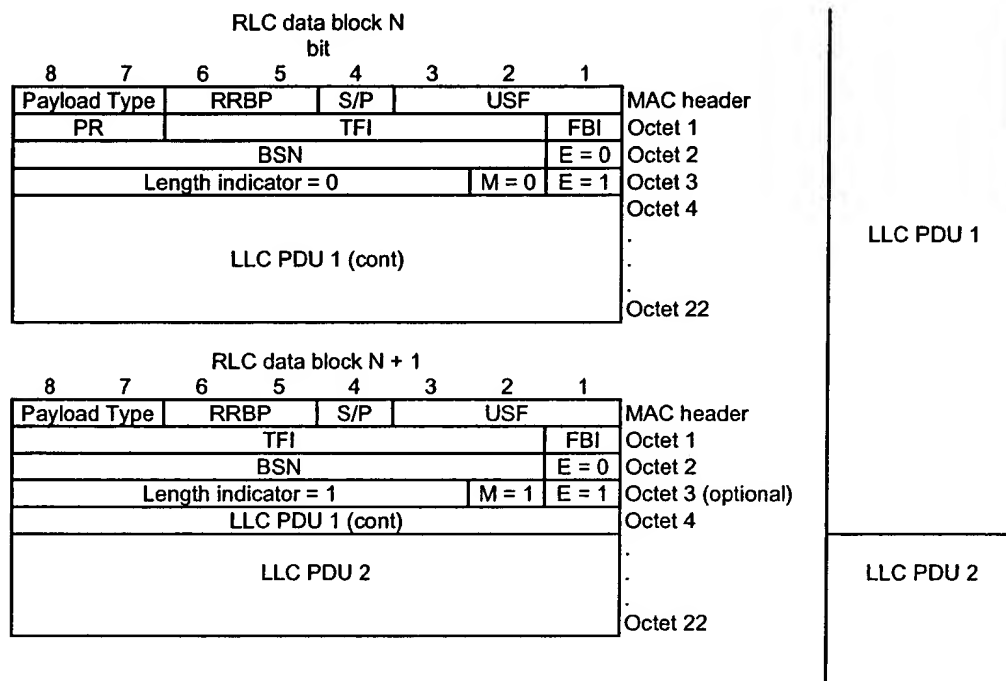


Figure B.2: Length indicator (LI) example

B.3 Example 3

Figure B.3 provides an example of the use of the Length indicator when the end of an LLC PDU fits precisely into an RLC data block. In the example, LLC PDU 1 continues from a previous RLC data block and ends in the RLC data block shown. LLC PDU 2 follows LLC PDU 1 and fills precisely the RLC data block shown.

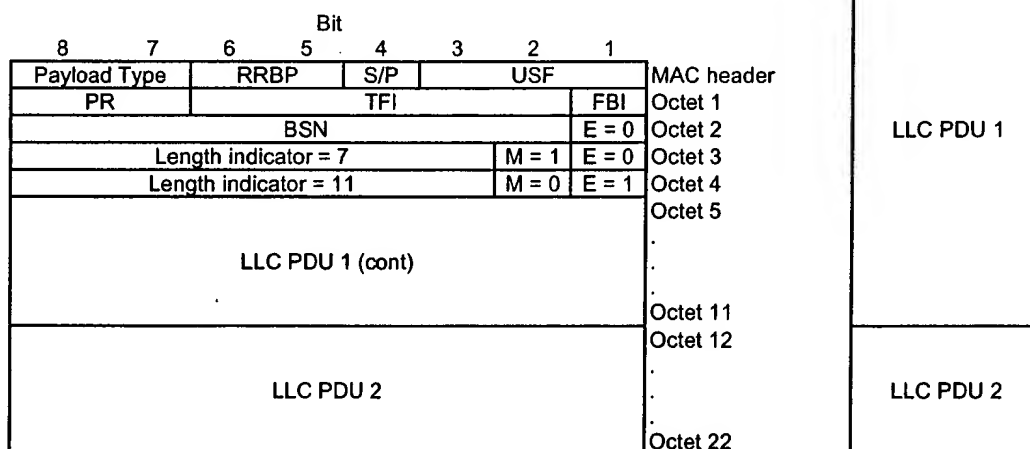


Figure B.3: Length indicator (LI) example

B.4 Example 4

Figure B.4 provides an example when the Length indicator is not used. As the example does not contain any LLC frame boundaries, no Length Indicator octets are needed. 20 octets is used for LLC data in each RLC data block.

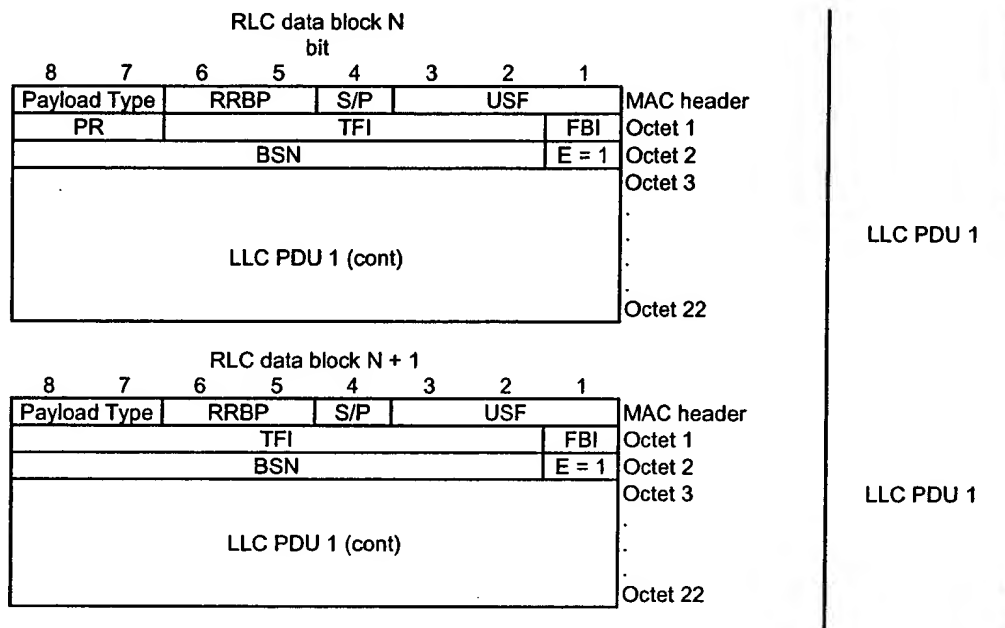


Figure B.4: Example when Length indicator (LI) can be omitted

B.5 Example 5

Figure B.5 provides an example when the final LLC PDU (FBI=1) of a *downlink* TBF fills the RLC data block precisely in which case the Length indicator can be omitted. In the example, LLC PDU 1 continues from a previous RLC data block and ends in and fills precisely the RLC data block shown.

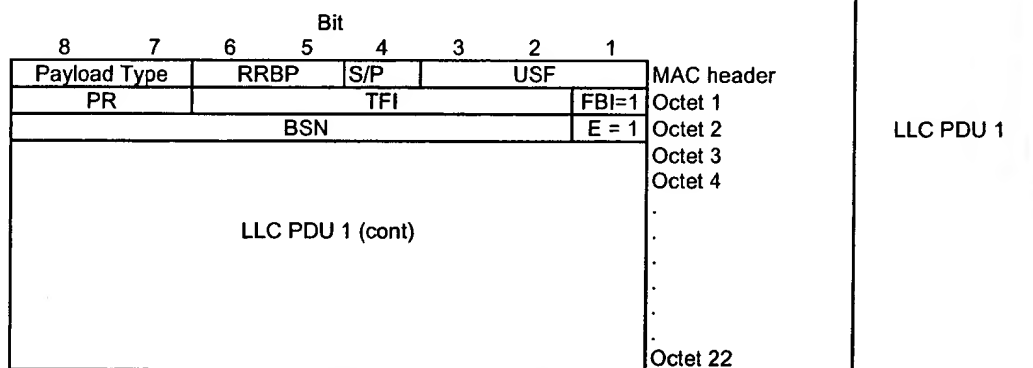


Figure B.5: Example when Length indicator (LI) can be omitted

B.6 Example 6

Figure B.6 provides an example when the final LLC PDU (CV=0) of an *uplink* TBF fills the RLC data block precisely in which case the Length indicator can be omitted. In the example, LLC PDU 1 continues from a previous RLC data block and ends in and fills precisely the RLC data block shown.

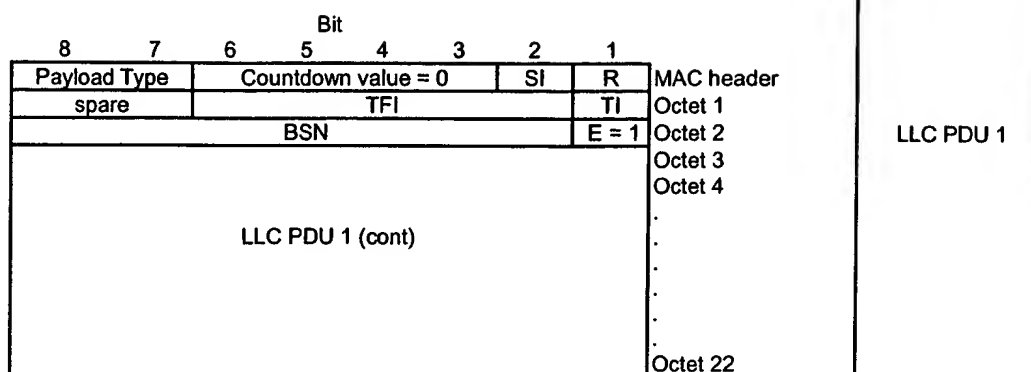


Figure B.6: Example when Length indicator (LI) can be omitted

B.7 Example 7

Figure B.7 provides an example when the Length indicator can be omitted. As the LLC PDU 1 begins in the RLC data block N and continues to the next one, no Length octet is needed.

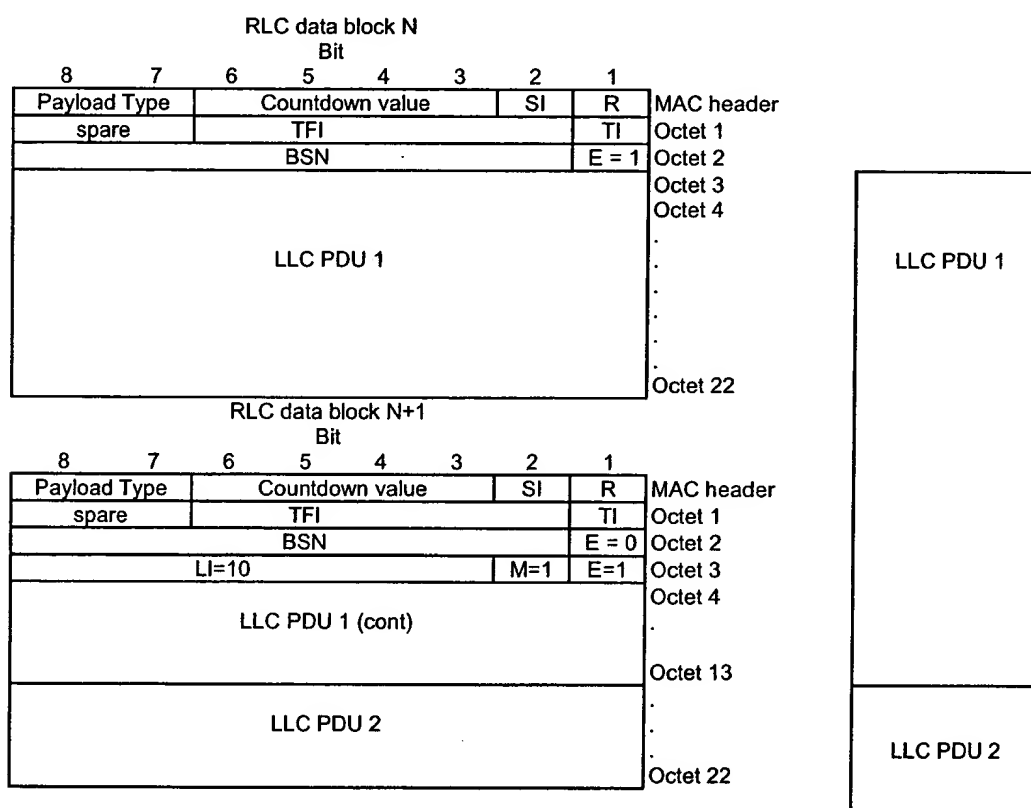
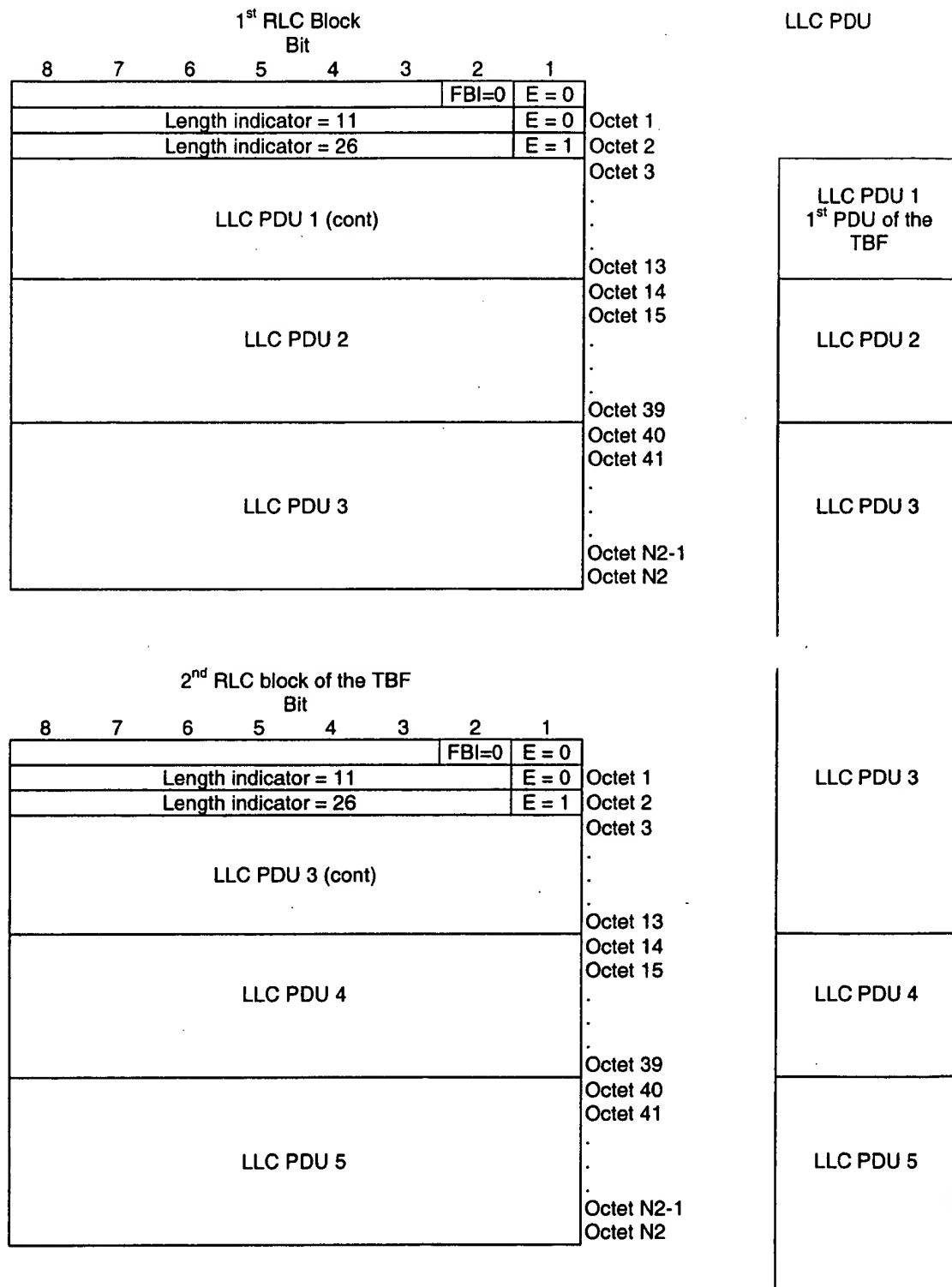


Figure B.7: Example when Length indicator (LI) can be omitted

EXHIBIT D

Examples for Delimitation of LLC PDU in EGPRS RLC data block (Down-link)

Example 1: First 2 RLC blocks of a TBF



Example 2: Last 3 RLC Blocks of a TBF that has N Blocks

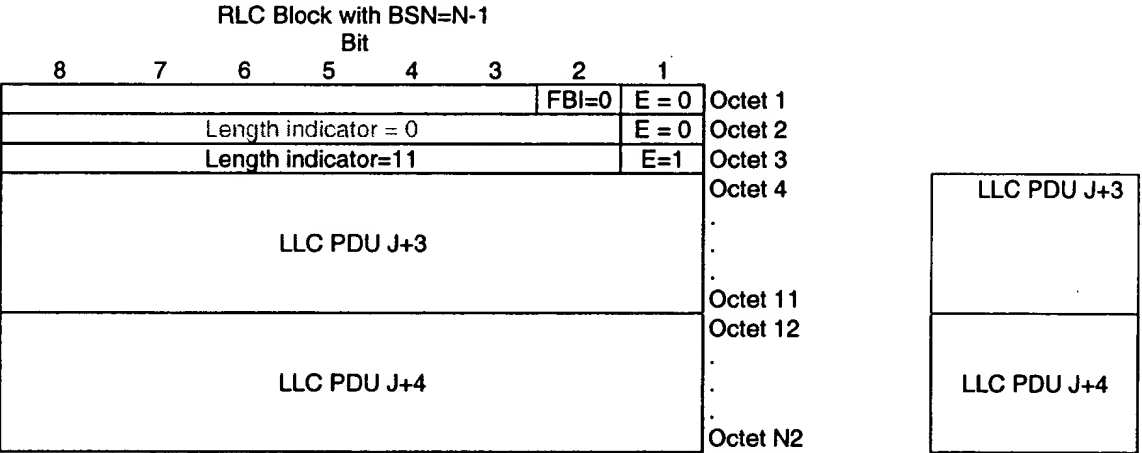
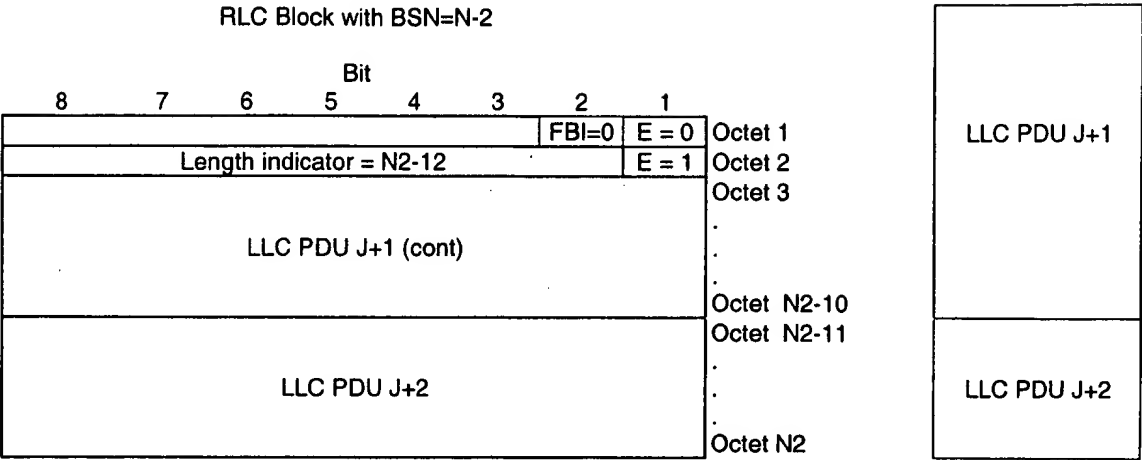
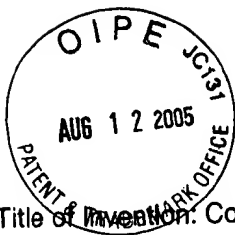




EXHIBIT E



INVENTION SUBMISSION FORM

⊙ Title of Invention: Consistent Posterior Delimiter of Payload in Layered Protocols

⊙ Name of Inventors, telephone, address and business unit:
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⊙ Name of principal person to work with attorney: David D. Huo

⊙ What problem does the invention solve or what purpose does it serve?
In GSM/EGPRS BSS protocol between LLC(Logical Link Control) and RLC/MAC(Radio Link Control/Medium Access Control), the payload LLC PDU (Protocol Data Unit) is carried within RLC data block, which has a fixed length. From spectrum efficient point of view, it is desired to fill the RLC data block as far as possible. Therefore delimiting the LLC PDUs within the RLC data block is necessary. Thus, at the RLC header length indicators (LI) are given in octets, depending on how many LLC PDU will be carried in the same RLC data block. A special case occurs, when the last LLC PDU fills the (remaining octets of a) RLC data block precisely, i.e. adding the LI octet would make the PDU out of the RLC data block boundary, then another RLC block would be required to carry the rest of the LLC PDU. In this case, two delimiters are required for one LLC PDU. This is a waste of capacity and may cost a lot of spectrum when services requiring short TBF(Temporary Block Flow) is supported, such as internet application.

⊙ Explain your solution. Attach any sketches, lab notebook entries, memos, etc., which help describe and illustrate the solution.

The invention proposes, (1). the last LLC PDU requires no delimiter, (2). when the last LLC PDU fills the rest of the RLC data block, then use LI=0 as the first LI in the next in sequence RLC data block. This simplifies the rule for delimiter and saves one octet in case the last (segment of) LLC PDU fills exactly the RLC data block. See also the attached drafts. Obviously this principle applies to all situations where layered protocols are used and delimiter of payload is required.

⊙ Under what circumstances would it be economically advantageous for someone outside of Lucent to make, use or sell the invention?

This will be adopted by the 3GPP TSG GERAN, the very standard body specifying the GSM/EGPRS standard, because the clear advantage compared to the current solution. It will become part of Release 99, the version of the GPRS system that Lucent is delivering/will deliver to its major customer AWS and T-Mobile under the written contracts. All companies that manufacture GSM/EGPRS will have to use the invention. (Therefore, **the patent application is urgent!**)

⊙ How easily could Lucent detect, or suspect, that someone was making, using or selling the invention?
As easy as reading standard GSM 04.60 and checking the release.

⊙ How easily can the invention be designed around? In other words, how easily can another designer achieve the same functionality with a different design and for roughly the same costs?
Don't know.

Inventors (all inventors should sign)/Date

Read and Understood the Invention/Date
(Signed by Supervisor of the Principal Inventor)

Fran. E. O'Brian, Technology Director/Date
Wireless Standards Development and Industry Relation